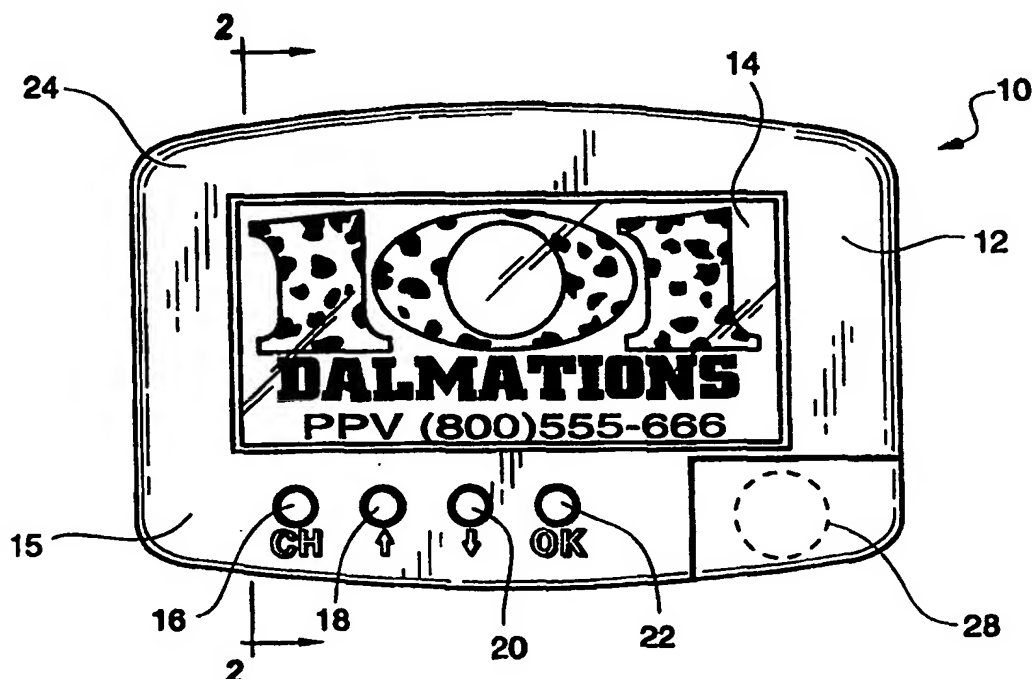




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(54) Title: WIRELESS ANNUNCIATOR WITH ADVERTISING DISPLAY



(57) Abstract

The annunciator includes a visual display, wireless receiving circuitry for receiving, from a host device, data including selected information to be displayed, and software and/or hardware for maintaining the selected information displayed on the visual display of the annunciator. The circuitry of the annunciator can include wireless transmitting circuitry. Further the annunciator can have mounting structure, such as a magnet for mounting the annunciator to a wall surface, such as a refrigerator door.

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WIRELESS ANNUNCIATOR WITH ADVERTISING DISPLAY

BACKGROUND OF THE INVENTION

1. Field of the Invention.

The present invention relates to an annunciator display device which is always on and which can wirelessly receive information to be displayed. Electronic information coming into the home can be displayed on a TV, or in some cases, a PC. When these devices are turned off, no information is displayed. However, the source of information is often still present, in the form of broadcast signals or cable TV signals which can be picked up by the annunciator of the present invention.

2. Description of the related art including information disclosed under 37 CFR §§ 1.97-1.99.

Heretofore, various systems have been proposed for the remote display of information, such as the display of prices on the edge of a shelf in a supermarket or information on the screen of a television set. Also, there have been proposed remote control devices with a visual display for displaying information and including credit card and smart card readers and built in modems or adapters for communicating with a modem. Several examples of such previously proposed remote control devices and remote display systems are disclosed in the following U.S. Patents:

	<u>U.S. Patent No.</u>	<u>Patentee</u>
20	4,888,709	Revesz et al.
	4,962,466	Revesz et al.
	5,204,768	Tsakiris et al.
	5,249,044	Von Kohorn
	5,285,278	Holman
25	5,287,181	Holman
	5,355,480	Smith et al.
	5,396,546	Remillard
	5,404,393	Remillard
	5,410,326	Goldstein
30	5,416,535	Sato et al.
	5,450,079	Dunaway
	5,455,570	Cook et al.
	5,461,667	Remillard
	5,488,423	Walkingshaw et al.

	5,497,185	Dufresne et al.
	5,500,681	Jones
	5,502,504	Marshall et al.
	5,504,475	Houdou et al.
5	5,523,794	Mankovitz et al.
	5,532,689	Bueno
	5,537,107	Furnado
	5,537,463	Escobosa et al.
	5,539,393	Barfod
10	5,539,479	Bertram
	5,546,316	Buckley et al.
	5,552,837	Mankovitz
	5,566,353	Cho et al.
	5,583,560	Florin et al.
15	5,594,509	Florin et al.
	5,603,078	Henderson et al.
	5,576,768	Gomikawa
	5,604,923	Wilkus
	<u>PCT Patent Publication</u>	<u>Applicant</u>
20	WO 93/12612	Yuen at al.
	WO 93/19427	Singer st al.
	WO 94/15417	Minimetrics Limited
	WO 95/32583	TV Guide On Screen
	WO 95/01056	Apple Computer, Inc.
25	WO 95/01057	Apple Computer, Inc.
	WO 95/01058	Apple Computer, Inc.
	WO 95/01059	Apple Computer, Inc.

SUMMARY OF THE INVENTION

According to the present invention there is provided a low-cost annunciator
 30 display device, or simply annunciator, capable of wirelessly (via IR or RF) receiving
 information to be displayed. The advantage is that, in contrast to a television or a PC,
 the display on the annunciator can always be on. The annunciator can act as a
billboard, touting pay-per-view events, products, services, coupon offers or any other
 advertising, as well as carrying information such as sports, news, finance, traffic, TV

guide, gaming, shopping, and features. With the added ability to wirelessly send information to a host device, interactive or transactional applications are possible.

The advertising message on the annunciator is an information *payload*, in the sense that an advertiser can be charged for time on the annunciator's screen.

5 When the annunciator is used in conjunction with interactive applications running on a settop box, the TV itself, or a computer, it is important that the interactive advertising offers appear during commercial program breaks and not extend into the program proper. In this case, the annunciator can extend the time available to the user to respond to interactive offers by "trailing" the offer to the annunciator's screen
10 after the interactive ad has disappeared from the TV (or PC) screen and regular programming has resumed.

Many systems which deliver information are two-way, meaning that information originating from the user can be read by or delivered to a central "head end." Such systems can allow transactions by the user, such as responses to advertising offers,
15 merely by pressing a button on the annunciator, thus bypassing the TV or PC as a display device.

In the case where the delivery medium for advertising to the annunciator is not two-way, "bypass" structure can be provided for return signals to a central computer. For instance, a low-cost radio transmitter in the annunciator can send data to an
20 autodialer modem connected to the telephone line. User responses to advertising offers can then be sent by telephone to a central computer.

Cable, satellite, or broadcast TV are the normal means for transporting information to the annunciator, using receiving circuitry in the settop box or the TV itself, along with an IR or RF wireless link to the annunciator. However, bypass of the
25 cable, satellite, or broadcast TV downstream link to the annunciator is also possible, using a paging network, FM SCA data on a radio station, a modem with a wireless link to the annunciator, or a wireless link to a computer which is in turn connected to a remote network such as the Internet.

The fact that the display on the annunciator can always be active and readable,
30 whether or not the TV or PC are turned on, is an important extension of the exposure of the user to advertising offers.

To accommodate the narrow bandwidth usually available on the wireless link between the sending device and the annunciator, images can be compressed before being sent to the annunciator. Either the bitmapped images can be compressed

using any one of several well-known compression algorithms, such as JPEG, or drawing commands can be sent to a GDI (graphics device interface) running in the annunciator.

By allowing the annunciator to receive executable code as well as static
5 images, the annunciator can display animated graphics, run interactive sessions with the user, or upgrade its own software to enhance its usefulness.

Thus, according to the present invention there is provided an annunciator including a visual display, wireless receiving circuitry for receiving, from a host device, data including selected information to be displayed, and software and/or hardware for
10 maintaining the selected information displayed on the visual display of the annunciator.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a wall mountable annunciator display device constructed according to the teachings of the present invention.

15 FIG. 2 is a sectional view through the wall mountable annunciator display device of FIG. 1.

FIG. 3 is a block circuit diagram of the circuitry in the wall mountable annunciator display device shown in FIG. 1.

FIG. 4 is a flow chart of the operations performed when one of the keys on the annunciator device is pressed.

FIG. 5 is a flow chart of the displays that are shown on the visual display when either the ARROW UP key is pressed or the ARROW DN key is pressed.

5 FIG. 6 is a flow chart of the steps that are performed and the displays that appear on the visual display when the OK key is pressed.

FIG. 7 is a flow chart of the steps that are performed to set the display device for showing the programming on a specific channel by pressing the CH key and one of the ARROW keys until the selected channel appears on the display.

10 FIG. 8 is a flow chart of the routine that is followed by depressing the CH key and the OK key at the same time in order to enter a code number such as a telephone number or credit card number.

FIG. 9 is a plan view of a display on the visual display of television programming for a one half hour period.

15 DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring now to FIG. 1 in greater detail, there is illustrated therein an

annunciator 10 constructed according to the teachings of the present invention. The annunciator 10 includes, on a top panel 12 thereof, an LCD visual display 14, and a keyboard 15 comprising a CH (channel) key 16, an ARROW UP key 18, an ARROW DN key 20, and an OK/SEND key 22.

5 It is to be noted that more or fewer buttons or keys can be provided on the keyboard 15. However, experience has shown that the fewer buttons or keys the better, making the annunciator 10 simpler to operate. One key that could be added is an ON/OFF key.

FIG. 2 is a sectional view through a housing 24 of the annunciator 10 shown
10 in FIG. 1 and shows that the annunciator housing 24 includes an open area for receiving a circuit board 26 and a flat battery 28. The visual display screen 14 can be touch sensitive, if desired, and is connected as shown to the circuit board 26.

Although a generally rectangular housing 24 is shown in FIG. 1, it is to be understood that the annunciator can have any shape desired, such as, for example,
15 a circular shape so that the annunciator can look like and serve as a beverage coaster.

An important feature of the annunciator of the present invention is the provision of mounting structure 29 on the back or underside of the housing 24. In the illustrated embodiment, the mounting structure is a magnet, much like a "refrigerator magnet".

20 It will be understood, however that other mounting structures 29 can be used, such as:

- a suction cup for attaching the annunciator 10 to an impervious surface;
- an adhesive for attaching the annunciator 10 to a surface;
- hook and loop material of the type sold under the trademark VELCRO fixed to
25 a surface of the annunciator 10 and mating hook and loop material fixed to a surface on which the annunciator 10 is to be mounted;
- a pin for attaching the annunciator 10 to a suitable material such as clothing; and,
- a chain, a string, a ribbon, a cord or other flexible structure for attaching or
30 hanging the annunciator 10 to or from another object or a person.

The annunciator 10 can have, alternatively, other structure for supporting the annunciator 10 on a generally horizontal surface with the visual display 14 facing laterally, much like a picture in a stand up picture frame, e.g. a fold out structure.

Referring now to FIG. 3, circuitry 30 for the annunciator 10 that is mounted on

the circuit board 26 in the housing 24 includes a microprocessor 32 connected to the keyboard 15, to an IR receiver 34 and, if desired, to an IR transmitter 35 and/or to an RF receiver 36 and, if desired, to an RF transmitter 37. The battery 28 is connected to a power conditioning circuit 38 coupled to the various components needing power.

5 A ROM/RAM 40 is coupled to a bus 42 connected to the microprocessor 32.

If desired, an EEPROM 44 also can be coupled to the microprocessor 32. An LCD driver circuit 46 is coupled between the bus 42 and the LCD visual display 14.

If desired, a sound synthesizing chip 48 can be coupled to the microprocessor 32 and to a speaker 50.

10 Another modification is to provide a card reader device 52 coupled to the microprocessor for reading a credit card and/or smart card.

Further, if desired, a motion detect circuit 54 can be coupled to the microprocessor 32, as shown.

In the operation of the annunciator 10, a signal is received either by the IR
15 receiver 34 or the RF receiver 36 and such signal contains selected information, typically including an advertisement. This advertisement is placed on the visual display 14 by the software and hardware in the annunciator 10 and is maintained on the display 14 unless a user of the annunciator 10 presses a key to obtain a display of other information or to send information.

20 Referring now to FIG. 4, which is a flow chart of the basic operating routine for the annunciator 10, it will be noted that, once a key is depressed, a determination is made if it is an ARROW UP key 18, in which case the program in the ROM/RAM 40 or EEPROM 44 goes to subroutine A shown in FIG. 5. If the key was the ARROW DN key 20, then the program goes to subroutine B, which is the other end of the routine
25 shown in FIG. 5.

If the key was the OK key 22, then the program goes to subroutine C shown in FIG. 6.

If the key pressed was the CH (channel) key, then the program goes to subroutine D shown in FIG. 7.

30 Finally, if two keys are pressed simultaneously, the OK key 22 and the CH key 16, then the program goes to subroutine E shown in FIG. 8.

As shown in FIG. 5, when the ARROW UP key 18, or the ARROW DN key 20 is pressed, the annunciator 10 will cycle through a series of different information displays. This cycling can be automatic or can be caused by repeated key presses

of the ARROW UP key 18 or the ARROW DN key 20.

Typically, as shown, the first press of the ARROW UP key 18 will cause a display of the date and time. Then, the next display will be of weather and temperature. The succeeding display is of traffic conditions. Next, a financial report
5 is displayed, followed by a sports score report and finally a TV programming display for a particular channel or time period as shown in FIG. 9. Of course, other information, such as a game, can be displayed on the visual display 14.

If the OK key 22 is pressed, then the program goes into subroutine C shown in FIG. 6. Assuming that an identifying code is present or has been programmed into
10 the annunciator 10, such code is now transmitted. The code can be a telephone number or a credit card number.

As shown in FIG. 6, pressing of the OK key 22 causes the annunciator 10 to transmit two signals containing certain information, namely the advertisement on the visual display 14 and the identifying code of the user. After these two signals are
15 sent, there is a time out period of a few seconds to few minutes, after which the program returns the advertisement to the visual display 14.

If the CH key 16 is pressed after a user has gone to the TV programming position in the subroutine shown in FIG. 5, a channel number will first appear on the display. Then, if the user wishes to change the channel number, he or she will press
20 the ARROW UP key 18 or the ARROW DN key 20 reach channel $X+N$ or $X-N$. Once the desired channel is reached, the channel number will appear on the display for a time out period of a few seconds to a few minutes and then will return to a display of the advertisement.

Alternatively, the annunciator 10 can be programmed to display the
25 programming on a number or all the channels over a short time period, e.g., one half hour, as shown in FIG. 9. Here, the annunciator 10 will scroll through the programming for the next one half hour period.

If the annunciator 10 does not come programmed with an identifying code, such as a telephone number or a credit card number, and the annunciator 10 is
30 configured to transmit a telephone number as an identifying number for the purchaser, the program will go to subroutine E shown in FIG. 8. Then, when the CH key 16 and the OK key 22 are pressed at the same time, a message will appear on the visual display 14 explaining how to enter the user's telephone number. In this respect, a message will be displayed saying:

"To enter your 10 digit tel. no. first press CH key. Then press ARROW UP key or ARROW DN key. Next press the OK key. Repeat the above steps for each no. until all 10 numbers are entered."

After all 10 numbers are entered, they are stored in the RAM/ROM 40 of the
5 circuit 30, shown in FIG. 2. Next, after a time out period of a few seconds to a few minutes, the display screen 14 will return to the display of the advertisement.

According to the teachings of the present invention, the annunciator 10 is programmed so that an advertisement is displayed on the screen 14 when the annunciator 10 is not being used or is otherwise in a quiescent state.

10 It is to be understood that an important feature of the present invention is the "restore screen after timeout sequence" which is shown at the end of each of the subroutines in FIG's. 5-8.

If the batteries are low, a subroutine can be provided to cause the annunciator to go through a "low battery sequence" which "pops up" a low battery message for
15 three seconds.

The annunciator 10 can be constructed, arranged and programmed to have or provide a number of features. For example, the software can maintain a display of selected information on the visual display even when the annunciator 10 is in a quiescent state or turned off.

20 It will be understood that the host device with which the annunciator 10 communicates, either by IR (34, 35) or by RF (36, 37) to receive or transmit information, can be a cable decoder box, a satellite decoder box, a telephone company decoder box, a television set, a computer, or a modem.

The wireless RF transmitting circuitry 36 and receiving circuitry 37 can be
25 constructed and arranged to receive RF data from a long range transmitting device such as a paging network, a FM/SCA, a cellular phone, digital communication systems such as PCS, PDM, CDM or other RF transmitting device.

If desired, the annunciator 10 can be constructed and arranged to exchange information with a modem, such as a wired modem or a wireless modem and the
30 intelligence for operating the modem can be in the annunciator 10. See U.S. Patent No. 5,537,463 to Escobosa and Darbee.

The memory, RAM/ROM 40, of the annunciator 10 can include a buffer memory capable of storing information for being displayed under command from a realtime clock in the annunciator 10 and the annunciator 10 can include software and

or hardware for querying the host device for date/time information.

The visual display 14 can be bistable, thereby requiring no refresh buffer and requiring no power to maintain an image on the visual display 14.

The information received from the host device can be in compressed form, can
5 be in the form of drawing commands, such that the software includes instructions for executing the drawing commands by drawing an image on the visual display 14 and/or can be a subset of an electronic program guide for display on the visual display 14 of the annunciator 10.

The software for detecting a low-battery condition can include instructions for
10 displaying an advertisement to replace the batteries with a specific brand of battery.

If desired, back-lighting can be provide for illuminating the visual display 14. See U.S. Patent No. 5,568,367 to Park.

Also, if desired, the annunciator 10 can include circuitry 48, 50 for producing sound.

15 Further, the annunciator 10 can include a reader 52 and associated circuitry for reading the magnetic stripe on a credit card or for reading or interfacing with a smart card containing a computer chip. See U.S. Patent No. 5,603,078 to Henderson et al. or U.S. Patent No. 5,532,689 to Bueno.

The motion detect circuit 54 can be used to place the annunciator 10 in a given
20 state when it is picked up by a user.

The operating software for the annunciator 10 can be programmed to cycle a buffer memory in the ROM/RAM 40 to display on the visual display 14 multiple categories of information.

The IR or optical receiving circuit 34 can be constructed to receive light signals
25 from a TV screen (VEIL technology) or other form of flashing from the TV screen using visible light (TIMEX technology).

The annunciator 10 can including pointing device circuitry for moving a cursor on the visual display 14 or a host display. See U.S.S.N. 08/605,546 for: SYSTEM FOR PROVIDING WIRELESS POINTER CONTROL.

30 The visual display 14 can include a touch-sensitive display screen or touch sensitive pads/keys on the annunciator 10. See Goldstein U.S. Patent No. 5,410,326.

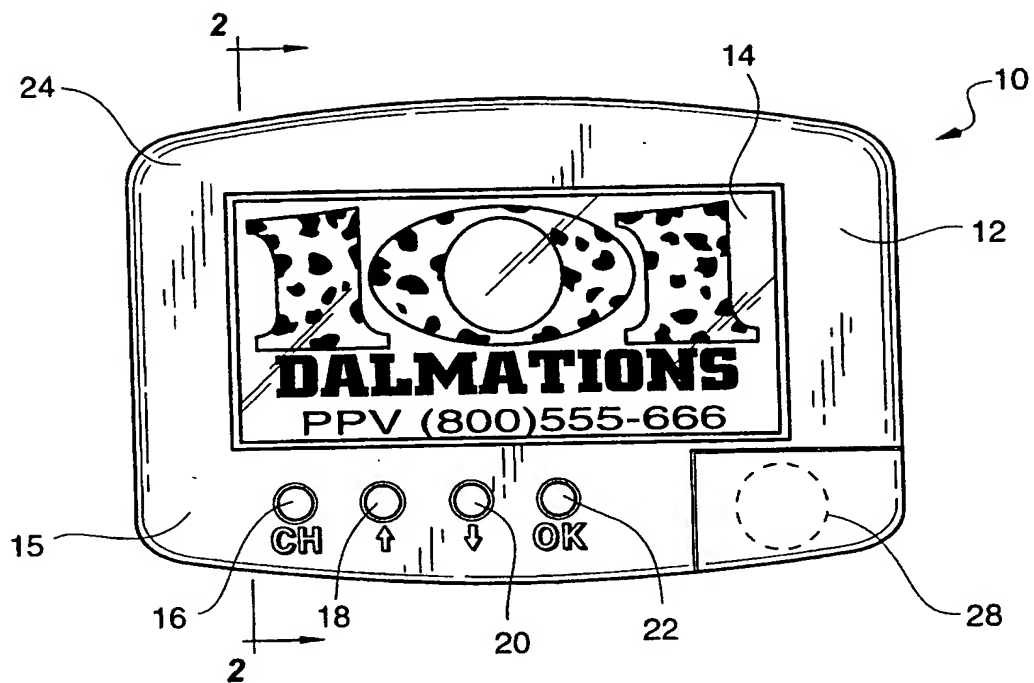
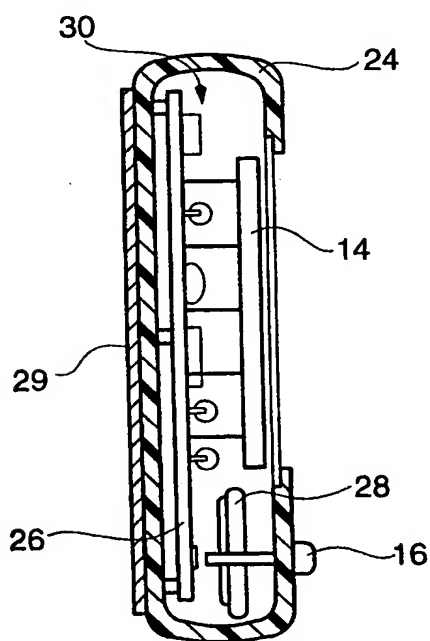
An important feature of the annunciator 10 disclosed herein is its ability to keep an advertisement on the display 10 and in front of a user. An ancillary feature is the ability of the annunciator 10 not only to display the advertisement, but also to have an

input, such as certain keys on the keyboard for enabling a user to respond to a displayed advertising offer via the wireless, IR or Rf communications link using the certain keys as described above and set forth in FIG. 6.

The received, and perhaps displayed, information can comprise: advertising
5 formatted the same way as a banner on a page on the world wide web; a "trailer" from
an advertisement appearing on a host device, thus giving the user more time to
respond to an offer in the advertisement; games which can be played on the
annunciator 10; codes for upgrading the annunciator 10; instructions for setting up the
annunciator 10; a user guide and/or context-sensitive help for display on the visual
10 display 14 of the annunciator 10; and, executable code to be run on the annunciator
10.

CLAIMS**We claim:**

1. An annunciator including a visual display, wireless means for receiving, from a host device, data including selected information to be displayed, and means
5 for maintaining said selected information displayed on said visual display of said annunciator.
2. The annunciator of claim 1 including means for maintaining said selected information on said display even when said annunciator is in a quiescent state or turned off.
- 10 3. The annunciator of claim 1 including wireless transmitting means for sending information to the host device.
4. The annunciator of claim 1 including a buffer memory capable of storing information for being displayed under command from a realtime clock in said annunciator.
- 15 5. The annunciator of claim 1 including means for producing sound.
6. The annunciator of claim 1 wherein the selected information displayed includes an advertisement.
7. The annunciator of claim 1 wherein said wireless receiving means includes means for receiving data via a radio signal sent from short range, such as
20 from a wireless modem, a settop box, a TV, a computer or a low power transmitter.
8. The annunciator of claim 1 including means for interfacing with a Smart Card containing a computer chip.
9. The annunciator of claim 1 including a touch-sensitive display screen.
10. The annunciator of claim 1 including means for mounting said
25 annunciator to an object, person or surface.
11. The annunciator of claim 10 wherein said mounting means is selected from the group consisting essentially of: a magnet for attaching said annunciator to a metal surface; a suction cup for attaching said annunciator to an impervious surface;. an adhesive for attaching said annunciator to a surface; hook and loop
30 material fixed to a surface of said annunciator and mating hook and loop material fixed to a surface on which said annunciator is to be mounted;. a pin for attaching said annunciator to a suitable piece of material, such as clothing; and/or a chain, a string, a ribbon, or other flexible means for attaching said annunciator to another object or to a person.

FIG. 1**FIG. 2**

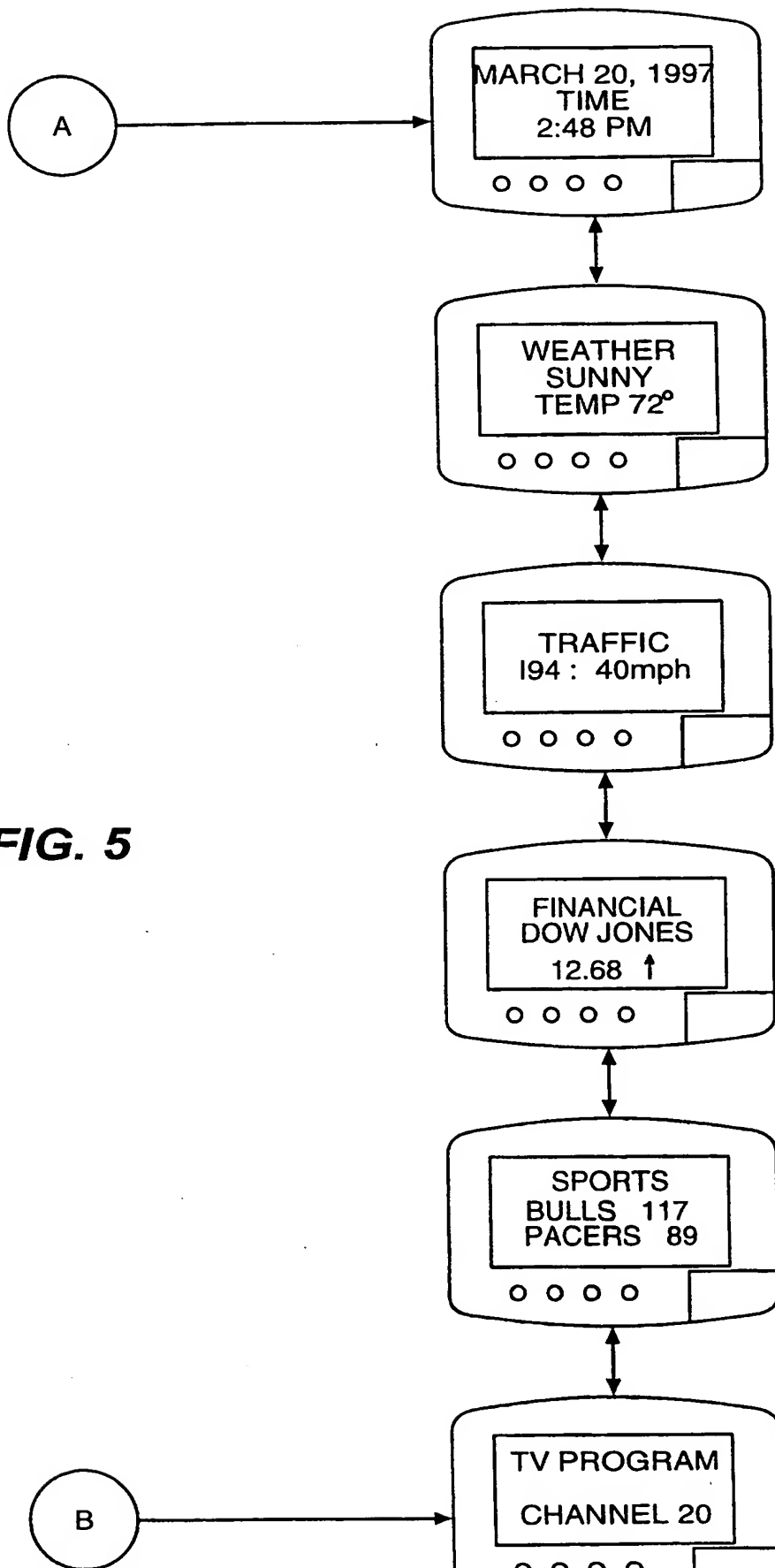
**FIG. 5**

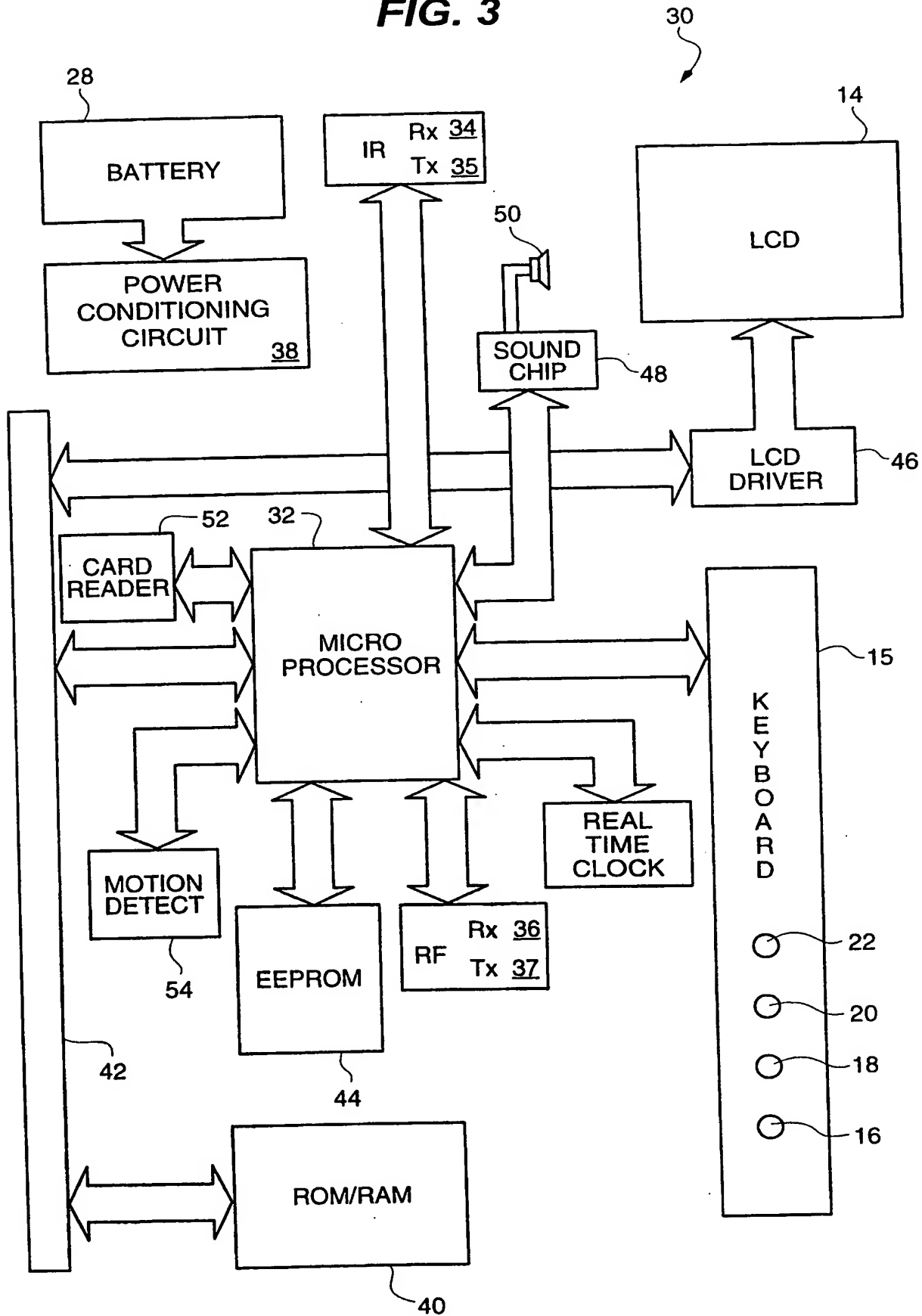
FIG. 3

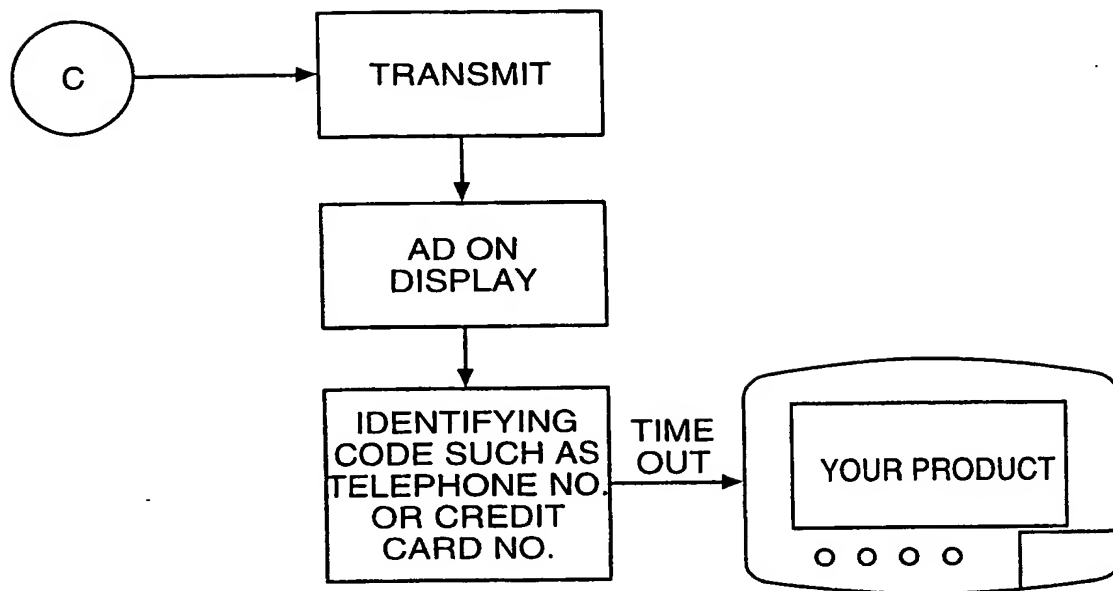
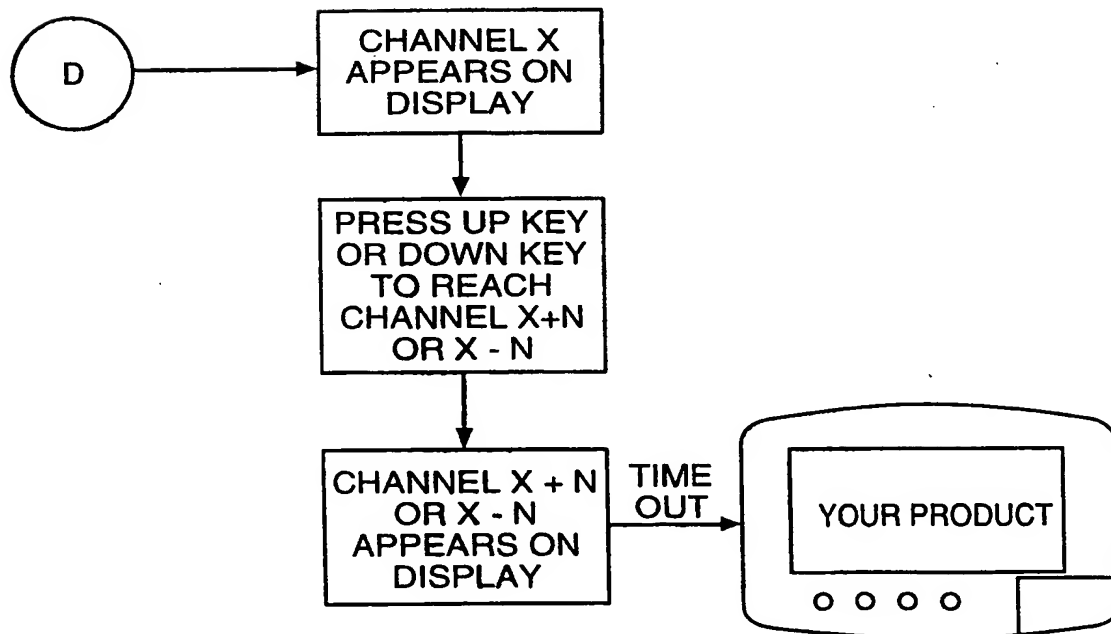
FIG. 6**FIG. 7**

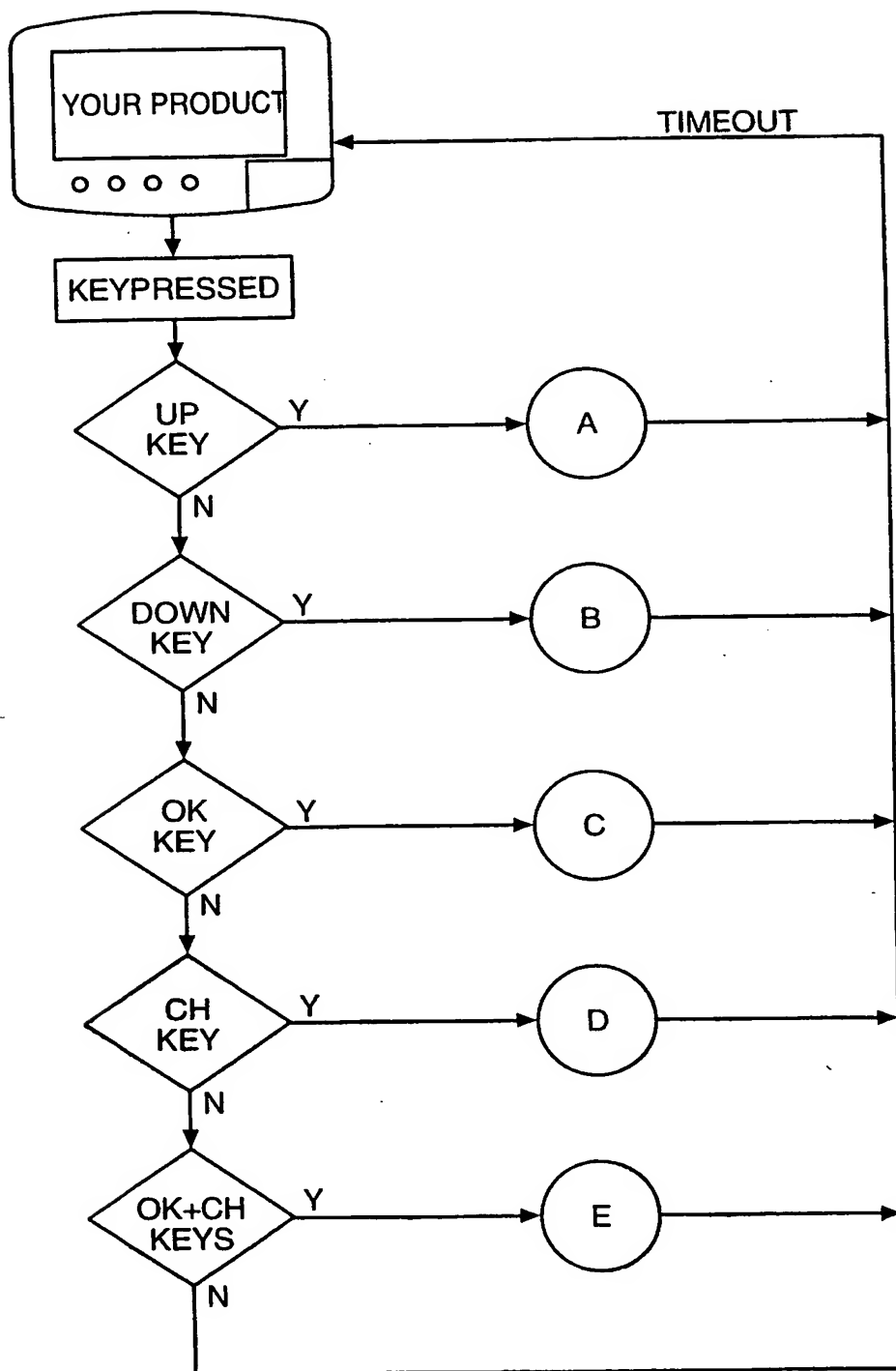
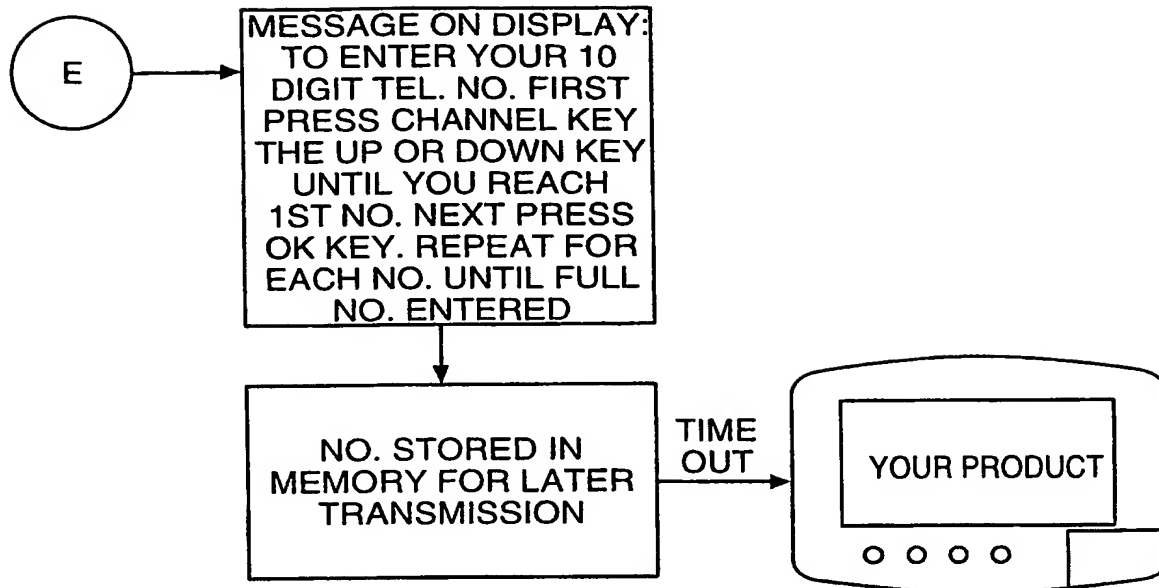
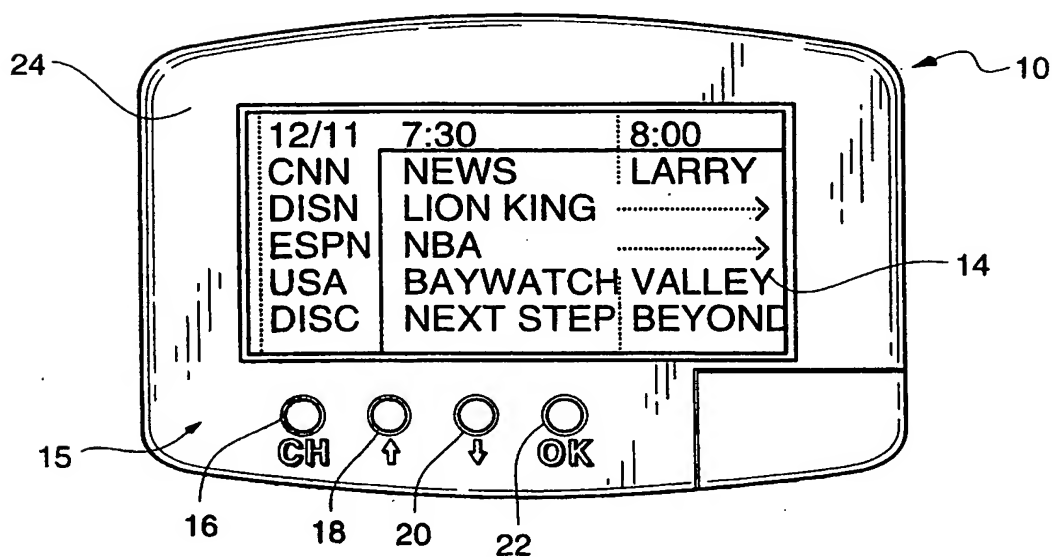
FIG. 4

FIG. 8**FIG. 9**

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/05367

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G09F27/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 26 01 272 A (SIEMENS) 21 July 1977 see claim 1	1-8, 10, 11
Y	DE 195 20 754 A (H. DIETER) 12 December 1996 see the whole document	1, 2, 4-8, 10, 11
Y	FR 2 738 931 A (B. MARCOZ) 21 March 1997 see the whole document	3
A	US 5 510 828 A (R. LUTTERBACH) 23 April 1996 see the whole document	1-7, 10, 11
A	DE 296 16 168 U (F. HEINZEL) 16 January 1997 see the whole document	1-11

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

7 May 1998

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/05367

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 461 371 A (K. MATSUMOTO ET AL.) 24 October 1995	
A	US 4 912 457 A (H. LADD) 27 March 1990	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/05367

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2601272 A	21-07-1977	NONE	
DE 19520754 A	12-12-1996	WO 9641317 A	19-12-1996
FR 2738931 A	21-03-1997	NONE	
US 5510828 A	23-04-1996	NONE	
DE 29616168 U	16-01-1997	DE 19637854 A	27-03-1997
US 5461371 A	24-10-1995	JP 2648527 B	03-09-1997
		JP 4084187 A	17-03-1992
		FR 2665288 A	31-01-1992
US 4912457 A	27-03-1990	NONE	